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ABSTRACT

In 1986, Columbia State Community College (CSCC) initiated the Center of Emphasis to develop interactive video and computer-assisted instruction programs for students. This charge included stimulating faculty interest in developing such programs and providing technical assistance in their production. Initially, center staff contacted faculty personally and used an interactive video tape on anatomy and physiology to make faculty aware of the technology. In addition, various incentives have been offered to faculty to encourage them to develop interactive video programs, including the assistance of center staff in the performance of the most time-consuming aspects of development, as well as the option to develop media programs to satisfy instructional improvement requirements. The center also provides faculty with the technical knowledge, guidance and assistance needed in the various stages of production. During the pre-production stage, center staff work with the faculty to create the video's objective, develop a script and storyboard, and record the audio portion of the video, which includes the interactive questions and the narration. When pre-production is completed, production of the storyboard begins, including the orchestration and filming of all live segments, still shots, modeling, and demonstrations. Finally, the post-production stage begins, as the video segments are edited and synchronized with the audio portion to ensure that there are smooth transitions between each visual image and the recorded script. After test runs, the interactive video is placed in the center laboratory for use and evaluation by student learners. From the conception of a topic to the delivery of a program to students, teamwork between the Center of Emphasis staff and the faculty is necessary to create a quality presentation. (VVC)

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FACULTY USE OF INTERACTIVE MEDIA TECHNOLOGY

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The Center of Emphasis, instituted at Columbia State Community College in 1986, has a central focus of developing interactive video and computer-assisted instruction (CAI) programs for students. Many of the programs housed within the Center were developed in collaboration with faculty members and produced within the media production facilities of the College. The uniqueness of the Center is the development of interactive video and CAI programs which are tailored to the specific educational requirements of Columbia State faculty.

This paper addresses 1) the methods used at Columbia State to encourage faculty to develop interactive video and CAI programs to supplement classroom instruction within their respective disciplines and 2) a step-by-step description of the preparation and production of these programs for faculty who possess limited knowledge of interactive media technology.

I. Recruitment of Faculty for Program Development

Stephen L. Stropes

In order to develop interactive video or CAI programs for instruction, the first priority is to stimulate faculty interest and involvement. Typically, many faculty wishing to develop programs may be hesitant to do so because of a lack of knowledge about media technology. To decrease faculty anxieties and increase their understanding of computer-based program development, the Center staff has promoted several activities to encourage faculty participation.

Initially, most of the programs developed for Center use consisted of repurposing pre-existing linear video tapes to interactive video tapes and developing new interactive video programs to supplement student instruction in Anatomy and Physiology. These programs were used as a template to generate awareness and interest among other campus faculty during open-houses, faculty inservices, and special workshop sessions. Center staff personally contacted individual

faculty members to encourage and solicit their participation in these events.

During the early stages of Center development the Curriculum Specialist, employed within the Center, organized an interactive video interest group. Faculty were invited to attend scheduled meetings and became involved in "hands-on" workshop sessions with the Center staff. During these sessions faculty were introduced to the basic methodologies of interactive video program development. Thereafter, many of these faculty shared their experiences and impressions with colleagues which generated interest among other faculty to visit the Center and to develop presentations for their students.

Time constraints frequently deter faculty from devoting the necessary time to develop high quality supplemental instruction for their students. A significant number of hours are required to design, develop and produce interactive video or CAI programs. Consequently, the Center staff helps to minimize the time expenditure required of a given faculty member by performing much of the tedious and time consuming work for him/her. Examples of activities that are quite time consuming include: scripting, storyboarding, taping, editing, creating graphic presentations, and conversion of programs from linear tapes to computerized interactive formats. These activities are performed by Center staff in collaboration with faculty members which decreases the faculty time commitment considerably. The faculty member develops a content script, describes and assembles visual materials and writes test questions for the interactive component of the presentation. The Center staff provides support for these activities, the technical expertise to produce the desired video, and computer programming for the presentation. In short, development of a presentation requires participation of faculty members, curriculum specialists, media specialists and support staff.

Other incentives have been offered to faculty to encourage their involvement with interactive program development. For example, faculty members may choose to develop media programs for instructional use to satisfy a portion of the instructional improvement requirements included in the College's annual faculty evaluation instrument.

In summary, the staff of the Center encourages and assists faculty in the development of interactive media instructional programs. Although technical knowledge or previous experience are assets, they are not essential for faculty to develop these programs.

Faculty participation in Center productions has increased as they have learned that tailored presentations enhance instruction and relieve the teacher of arduous repetition characteristic of many areas of instruction. Interactive video presentations function as private tutors which may be engaged by students until the desired comprehension is achieved. This use of presentations is particularly helpful to instructors who teach laboratory courses, such as biology and nursing, that require significant repetition for the

student to master the desired laboratory content.

In addition to the development of interactive video and CAI programs by faculty and Center staff, commercially-produced programs are available for student use through the Center facilities. The Center receives numerous publications that list and describe commercially available programs designed for college-level instruction. Faculty are given the opportunity to preview programs pertinent to their respective disciplines. If a faculty member wishes to use a commercially-produced program for instruction the Center purchases the program and makes it available for student use in the Center laboratory. Many of the purchased programs have been converted, with permission of the vendor, to interactive formats so that they conform to the requirements of particular faculty members.

II. Steps and Procedures in the Preparation of Materials for Media Production

Charlotte Ann Neeley

The majority of the instructional media designed and produced within the Center of Emphasis consists of Level III interactive videotape programs. When working with the Department of Nursing, each step within the various phases of design and production is completed by the Curriculum Specialist and submitted to that Department for formative evaluation and approval before proceeding to the next step or phase. When working with faculty members in other Departments of the College, the Curriculum Specialist provides instruction, guidance, assistance, formative evaluation and positive reinforcement throughout each step of the various phases of media production.

A contract for service, which enumerates the steps of production from design to delivery, is completed prior to beginning each program. The format of the program, linear tape time and an individual to narrate the script are designated by the contracting faculty/department. Target dates for completion of the various steps and procedures are proposed by the Center staff. Consensus upon format, tape time and target dates between the two parties is indicated by the signatures of all participants.

Steps and Procedures

Media materials are prepared in three (3) phases:

1. pre-production
2. production
3. post-production.

Pre-Production

The first step in preparing materials for media presentations is similar to the first step in preparing lecture or laboratory materials; that is, the development of measurable, behavioral objectives. Usually, two or three objectives per 15 minutes of linear tape is the maximum number which can be accomplished, especially when the target group of learners are novices in the subject matter. The more complex the learning level of each objective, the fewer the number of objectives that can be accomplished in 15 minutes. For example, the ability to evaluate the importance of subject matter in a given situation is more complex than the ability to grasp its meaning and will require considerably more instruction over a longer period of time. When the complexity of the objectives and the time allocated for the learner to meet the objectives are incompatible, one or both must be revised.

The second step is development of a script which will prepare the learner to meet the objectives. Scripts consist of two parts:

1. the audio portion which is the subject matter that will prepare the learner to meet the objectives and
2. the video portion which describes the visual images that will be used to illustrate the subject matter. The video portion of a script frequently is called the storyboard.

Depending upon the rate (words per minute) of the audio presentation, 8 to 10 type-written, single-spaced pages, using approximately sixty percent (60%) of the page width, is the maximum page length of the audio for each 15 minutes of linear tape. The remaining forty percent (40%) of each page is used for the storyboard, margins and separation between the audio and the storyboard.

Addition of the storyboard usually necessitates a variety of spacing techniques throughout the script to align each segment of video with the proper segment of audio. Spacing of the audio to accommodate the storyboard will increase the length of the manuscript by several pages. The use of a word-processing or script-writing program reduces development, revision and reproduction time as well as frustrations and writer's cramps.

Audio portions of scripts are more interesting and apt to capture the learner's attention when a variety of sentence structures are used. Short, choppy sentences become boring rather quickly. Long, intertwined sentences tend to lose their emphases and confuse the learner. Sentences composed with a natural flow which can be narrated with rhythmical peaks and valleys are more likely to capture the learner's attention than short choppy sentences narrated in a monotone.

voice. Rhythmical sentences also allow verbal emphases upon points of import.

The third step is the development of a storyboard which exemplifies the author's visualization of images that will illustrate the audio. A storyboard contains definitive descriptions of the visual images, the sequences of these images and the formats in which they are to be presented to illustrate each segment of the audio. A segment of audio may be a part of a sentence, an entire sentence, a group of sentences or a whole paragraph.

Storyboards may include, but not be limited to:

1. tight shots (close-up) when the desired visual field is narrow in either the horizontal or vertical plane (e.g., figures containing minute detail, illustrative material that is small in scale or isolation of objects or activities from their existing environment),
2. wide shots (far away) when the desired visual field is wide in either the horizontal or vertical plane,
3. live shots to capture motion in progress,
4. still shots to capture images of motionless objects or figures,
5. animated objects or figures,
6. inanimate objects or figures,
7. 2 or 3 dimensional objects or figures,
8. photographs, graphics or drawings,
9. simulations of situations or settings,
10. demonstrations of procedures or interactions,
11. character generation (printing of alphanumeric or symbolic characters alone or in combination with objects or figures),
12. colorization of backgrounds, objects or figures, or
13. any combination of 2 or more of the above.

Limits in storyboarding are defined only by one's imagination, copyright laws and equipment capabilities.

Equipment capabilities should not control one's imagination. The media specialist may be able to manipulate the video and/or audio equipment to accommodate the most active and vivid imagination. Imagination and creativity often are the variables which distinguish an extraordinary presentation from a mediocre one.

The fourth step is the development of test questions to measure the learner's accomplishment of the objectives. Test questions may be positioned at various points throughout the presentation and/or at the end of the presentation.

Test questions may be written with multiple choice, matching or narrative responses. When using multiple choice questions, the use of four alternatives is preferred over five alternatives to avoid regression toward the mean created by choosing the middle alternative if the learner is guessing at

the correct response.

Reinforcements to test question responses may consist of a simple statement of "Correct" or "Incorrect". "Incorrect" statements may be accompanied by explanations of why the learner's responses are incorrect if allocated computer/disk storage space is adequate for this function. Following an "Incorrect" response, the media presentation may continue forward with additional instruction or the segment of the presentation in which the correct response is located may be presented one or more times for remediation.

The number of opportunities given the learner to select the correct response may range from one to the number of alternative responses for each question. Remediation may follow each incorrect response or follow only the first incorrect response.

Presentations produced by the Center usually contain test questions placed at intervals throughout the text and at the end of the presentation. Questions within the text are programmed to allow one opportunity for a correct response to each question. Reinforcement consisting of "Correct" or "Incorrect" and remediation for each incorrect response immediately follow the learner's response to each question. Test questions at the end of a presentation (exit test) are programmed to allow one opportunity for a correct response to each question which is followed by a reinforcement consisting of "Correct" or "Incorrect". No remediation follows incorrect responses to exit test questions.

Record-keeping of the number of correct or incorrect responses and the number of attempts required to select the correct response for each question is an optional feature which is controlled by the authoring system. Currently, all materials in the Center are used to supplement rather than to replace classroom instruction and such record-keeping procedures have not been implemented.

The fifth step of the pre-production phase consists of recording the audio portion of the script onto one of the two audio tracts of a video tape. To obtain a non-obtrusive audio recording, select a narrator who is enthusiastic about the project, who has a voice that is pleasing to the ear and who is comfortable with a microphone, a tape-recorder and repetitive performances. Very seldom is the first performance a perfect one. When presentations have a predetermined linear tape time, fitting the narration into that prescribed time may require numerous performances over several hours. Pauses that are too long or too short, a dry mouth, reading faster than one speaks, eating the microphone (audible breath sounds, sniffs, brushes of the microphone with the eye lashes, or rustling of script pages) and the need to breathe are other variables which require rest periods, re-positioning of the narrator, re-alignment of reading materials and "retakes" of the audio portion of a presentation.

Other factors to consider when selecting a narrator and recording the audio include reading the script in the rhythm in which it was written (acknowledging commas, periods and

transitions between sentences, paragraphs and topics) and speaking with peak and valley fluctuations in the voice which is essential to accentuate parts of the script requiring emphases and to maintain the attention of the learner. Narration of a script in a monotone voice or as if it were one sentence is not only boring but often fails to accomplish the purpose(s) of the presentation.

Narration of the script prior to beginning the videotaping is a tremendous aid in determining the real (clock) time of each video segment and all segments in toto. Moreover, matching video segments to audio segments while recording the video is much easier and less time consuming than trying to match either one to the other during the final editing process.

Although one may have collaborated and consulted with the media specialist while writing and storyboarding the script, one or more pre-production meetings between the author and the media specialist prior to entering the production studio is essential to establish a common understanding of what is to be video-taped, how it is to be taped and when it is to be taped before beginning the actual videotaping.

Additionally, materials intended for use as "props" or "sets" should be identified and assembled prior to entering the studio. Mounting, colorization or any other type of modification required for "props" to become camera-ready should be completed prior to beginning video taping. Individuals performing demonstrations or serving as models should be identified. Informed consents designed and approved for the use of visual images should be completed prior to permitting these individuals to enter the studio.

Anyone contributing to or providing support for the presentation is entitled to recognition in the credits unless they wish not to be included. Even though the contributions of an individual or institution may be small, the courtesy of recognition usually is appreciated and should be included in the planning of time and space for credits.

Supplemental or support materials are those materials which the author deems essential or desirable for the learner to examine while using the presentation. Examples of support materials include bone replicas and dissected cats for anatomy and physiology or needles, syringes, and medical records for nursing. These materials accompany the presentation for "hands on" experiences by the learner during the presentation. Frequently, test questions are based upon the structure, function and use of these materials.

One or more copies of the test questions and the completed script are given to the computer programmer as soon as the script and test questions are finalized so that the skeletal CAI program which will govern presentation of the various audio and video segments, testing and remediation can be developed. This is considered a skeletal program until the completed video tape is time-coded and separated into presentation and remediation segments.

Test questions are designated as either "text" or "exit"

questions. The correct responses to "text" questions are designated within the script to enable the programmer to identify remediation segments for incorrect responses to these questions while writing the skeletal CAI program. When support materials are to accompany a presentation, they are given to the laboratory assistant for duplication before beginning the production phase so that they will be ready for use upon completion of the presentation.

Production

When all pre-production activities are completed to the satisfaction of the author and media specialist, production of the storyboard begins. During this phase, the author becomes the content director and producer while the media specialist becomes the technical director and producer working in a synergistic relationship.

Responsibilities of the content director/producer include setting up still shots, orchestrating live shots, modeling or acting, performing demonstrations, filling any void of production personnel that may arise and determining whether a taped segment conveys the desired message and characteristics. Responsibilities of the technical director/producer include operating all of the production equipment (video, audio, lighting, etc.) required to convert intangible thoughts and ideas to tangible video images.

Very seldom is the first taping of a segment considered a perfect "take" regardless of whether it is a still shot or a live shot. Live shots may require numerous attempts to achieve the desired effects in synchrony with the audio. Differences between the audio and video components of only one or two seconds often become critical differences. Still shots frequently require two or more attempts. Consistency and continuity in colors, lighting and the positioning of people and objects require both time and patience.

Post-Production

The first step of the post-production phase consists of editing the video segments into a continuous and contiguous video tape which is synchronized with the narration of the script. The content director/producer continues to work closely with the technical director/producer to select the video segments which best convey the intended message, determine the "inpoints" and "outpoints" of each visual image and achieve the most visually esthetic transitions from one segment to another throughout the linear tape.

An "inpoint" is the exact word of the narration or the exact second of a pause at which a visual image is to appear on the video tape. An "outpoint" is the exact word of the narration or the exact second of a pause at which that visual image is to disappear from the video tape. An "inpoint" for one image may be the "outpoint" for the preceding image or an "outpoint" for one image may be the inpoint for the following

image. Visual images may be preceded or followed by a designated key color during transitions from one topic to another. A key color is a single hue of one color which is used as a background for visual images or which is interspersed between two images to effect a smooth transition from one to the other.

The completed linear tape is reviewed by the directors/producers and by representatives of the Department for which it was produced. Revisions are completed as indicated.

The second step is to time code the video tape. A special time-coding program is used to time code one of the two audio tracts of the master video tape. Time coding consists of transferring four tone pulses (beeps) per second from the special time-coding program to the master video tape. Each tone pulse is counted and the numeric value of each pulse is recorded during the time coding of the video tape.

During the third step, a separate time-code reading program is used to log (identify) all time code pulses throughout the video tape. The numeric values defining each segment of video are identified by viewing the linear tape and manually recording these values for the beginning and end of each segment. Entry of the numeric values indicating the beginning and end of each video segment into the CAI program completes the computer programming process.

The fourth step of the post-production phase is to "test-run" the presentation and, if necessary, adjust the CAI program to correct any program errors or tape slippage. The completed master presentation is reviewed by representatives of the proper Department. Revisions are completed as indicated.

Finally, when the CAI program is governing presentation of the video segments, test questions and remediation segments are in the proper order and necessary approvals are received, copies of the video tape and CAI program are completed and placed in the Center laboratory for use and summative evaluation by student learners. Students complete a written evaluation of each presentation following their first use of it.

From the conception of a topic to the delivery of a program into student use, teamwork among the Curriculum Specialist, faculty members, media specialist, production assistant(s) and programmer(s) is of the utmost importance. Everyone must do their part and be receptive to the ideas and suggestions of others. Quality presentations do not just happen; they are made to happen through the efforts of many knowledgeable, competent and talented people.

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